

CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 2 November 2001 with an application for Letters Patent number 515259 made by GINFAX DEVELOPMENT LIMITED.

Dated 7 January 2004.



Neville Harris
Commissioner of Patents, Trade Marks and Designs





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PATENTS ACT, 1953

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PROVISIONAL SPECIFICATION

"PHOTOGRAPHIC FILM CARTRIDGE AND CAMERA INCLUDING SUCH"

We, **GINFAX DEVELOPMENT LIMITED**, a company duly incorporated under the laws of Hong Kong, of Unit 10-11, 13th Floor, Block A, M P Industrial Centre, 18 Ka Yip Street, Chai, Wan, Hong Kong, do hereby declare this invention to be described in the following statement:

FIELD OF INVENTION

The present invention relates to a photographic film cartridge and camera including such and in particular though not solely of a kind to provide a semi disposable use.

BACKGROUND OF THE INVENTION

Nowadays, commonly used photographic films include 135 films, 120 films, 110 films and APS films, among which 135 films are the most popular films. 120 films are mainly used for commercial purposes because of their high quality and larger sizes. The size of 110 films is relatively small and its quality is relatively low, so it is not very popular. APS is a new technology and has a lot of advanced features, however, its film development system is not compatible with 135's , so the growth of APS has been restricted.

The development of disposable cameras has been comparatively fast. There are many advantages in that they are easy to operate, low in cost, easy to carry and the quality is acceptable. Disposable cameras are particularly suitable for beginners. Since the procedures of inserting and removing the film involves some degree of knowledge and skill, the current disposable camera avoids the possibility of errors as far as loading of films is concerned because the film is pre-loaded.

There are two main disadvantages of disposable cameras. The cost of buying the camera includes both the camera set and the film set, but the camera set is disposed of after a single use although some of them may be recycled. This creates waste. Secondly, being a disposable item in nature, there is tight control on the production cost which therefore restricts the inclusion of more advanced features such auto flash, auto wind and higher quality lens.

People have been trying to develop a product which can produce good quality photos like an ordinary 135 film camera but at the price of and with simplicity of operations of a disposable camera.

A combination camera body with features such as the lens, shutter, dark room and film winder which was capable of receiving a replaceable film cartridge has been available to the public before. The cartridge for use with the camera body came in the form of two film spooling regions, a first where the film was spooled in an used state and another

spooling region where the film was advanced to after having been exposed. The two spooling regions were interconnected by a bridging portion wherein the bridging portion held the film in a position relative to the lens and shutter to allow exposure of each frame of the film to occur. The spooling regions were effectively light sealed regions such that any film within the spooling regions could not be exposed by light. The film extending across the bridging region was able to be exposed by light and, when in use, such light was controlled by the lens and shutter arrangement of the camera body. The cartridge, outside of the camera body, did not provide any dark room effect to the film between the two spooling regions. Hence the use of cameras of this type required for the film to be inserted into the camera body and remain within the body during the stages where the film was advanced from one spooling region to another, if no undesirable exposure of the film was to occur as a result of the cartridge being removed from the camera body and thereby allowing any films extending across the bridging region to be exposed. Such earlier designs hence did not lend themselves to allowing for film cartridges to be removed midway during use of the film without risking detrimental exposure of the film extending between the two spooling regions. Earlier type of design also required separate apparatus for processing the film in terms of handling the film from the cartridge after it had been used. Since the predominant format of film now is the 35mm format and indeed the earlier film types in the cartridges such as the 110 format are now very uncommon, most development labs are set up for developing the 35mm format or the APS format. Any introduction of a new format may mean that further handling equipment will need to be purchased by development labs to which there will be resistance. It would hence be desirable for a film cartridge to exist which includes a standard 35mm film incorporated with a film canister which will make the subsequent handling of the film for development by development labs convenient.

It is accordingly an object of the invention to provide a photographic film cartridge which may be used with a camera body which provides greater flexibility and convenience of use or which will at least provide the public with a useful choice.

It is a further object to provide a camera and film cartridge combination set which provides greater flexibility and convenience of use or which will at least provide the public with a useful choice.

It is a further object of the present invention to provide a film cartridge which includes a preloaded film engaged for scrolling to and/or from a standard 35mm or APS film canister.

SUMMARY OF THE INVENTION

Accordingly in a first aspect the present invention broadly consists in a film cartridge containing a film for engagement with a camera body to thereby in combination allow the capturing of an image onto the film in reliance on appropriately provided and positioned light control and projection means of said camera body to selectively allow light to be projected onto a portion of the film in said cartridge to thereby be exposed by said light , said film cartridge comprising:

an unexposed film spool region

a second spool region

a bridging portion between said unexposed film spool region and said second spool region via which said film can be advanced to at least in part be moved from said unexposed film spool region to said second region

said bridging region providing a dark room for said film between said unexposed film spool region and said second spool region

said bridging region including an opening positioned such that when said film cartridge is engaged with said camera body, film is presented for exposure by light admitted through said light control means of said camera body and said opening of said film cartridge, and

wherein a door is provided to said film cartridge to selectively move between a first and second position wherein in said first position said opening is closed to prevent light from entering said dark room and in said second condition said opening is presented to allow exposure of said film.

In a second aspect the present invention broadly consists in a camera having a camera body and a film cartridge containing a film, in engagement with said camera body

to thereby in combination allow the capturing of an image onto the film in reliance on appropriately provided and positioned light control and projection means of said camera body to selectively allow light to be projected onto a portion of the film in said cartridge to thereby be exposed by said light wherein said film cartridge comprises:

an unexposed film spool region

a second spool region

a bridging portion between said unexposed film spool region and said second spool region via which said film can be advanced to at least in part be moved from said unexposed film spool region to said second region

said bridging region providing a dark room for said film between said unexposed film spool region and said second spool region

said bridging region including an opening positioned such that when said film cartridge is engaged with said camera body, film is presented for exposure by light admitted through said light control means of said camera body and said opening of said film cartridge, and

wherein a door is provided to said film cartridge to selectively move between a first and second position wherein in said first position said opening is closed to prevent light from entering said dark room and in said second condition said opening is presented to allow exposure of said film.

Preferably said door is maintained in said first position until said cartridge is fully engaged in said camera body.

Preferably when in a fully engaged condition said camera body and said cartridge cooperated to define a region which is light sealed save for then said light control means is activated to expose part of said film in said bridging portion.

Preferably said door is actuated to move between said first and second positions by an actuation means of said camera body.

Preferably said actuation means engages a safety latch for said door to trigger the movement of said door from said first position to said second position.

Preferably a spring is used to move said shutter from said first position to said second position.

Preferably said door is pivotably engaged to said bridging region.

Preferably said door is translatable engaged to said to said bridging region.

Preferably said actuation means engages a safety latch for said door to trigger the movement of said door from said second position to said first position.

Preferably a spring is used to move said door from said second position to said first position.

Preferably said actuation means becomes operable to move said door upon the action of insertion and removal of the cartridge with the camera body.

Preferably said actuation means is operable by the action of the user once the cartridge is fully engaged with the camera body.

Preferably said actuation means is operable upon depression of the camera body shutter control button.

Preferably said film is provided inside said cartridge, engaged to a film canister preferably of a standard 35mm format.

Preferably said film canister is located at said unexposed film spool region of said cartridge such that during advancement of said film for exposure, said film is at least in part transferred from said canister to said second spool region.

Preferably said film canister is located at said second spool region of said cartridge such that during advancement of said film for exposure, said film is transferred from said second spool region to said canister.

Preferably said film cartridge is provided for use in a condition wherein said unexposed film is in a substantial part spooled in said unexposed spool region and wherein said film extends to a distal end thereof engaged to said film canister located in said second spool region.

In a further aspect the present invention consist in a camera body for use in combination with a film cartridge as herein before described.

In a further aspect the invention consist in camera body and at least one film cartridge as herein before described provided in a marketable pack suitable for retail.

In yet another aspect the present invention broadly consists in a camera or a film cartridge for use to define a camera having a control unit with which said cartridge can in engagement with said control unit in combination allow the capturing of an image onto the film in reliance on appropriately provided and positioned shutter and projection means

of said cartridge to selectively allow light to be projected onto a portion of the film in said cartridge to thereby be exposed by said light wherein said control unit provides at least one of a trigger for activating the movement of said shutter, a flash, a film winder, a view finder, a film counter and wherein said film cartridge comprises:

an unexposed film spool region

a second spool region

a bridging portion between said unexposed film spool region and said second spool region via which said film can be advanced to at least in part be moved from said unexposed film spool region to said second region

 said bridging region providing a dark room for said film between said unexposed film spool region and said second spool region

 said bridging region including a light aperture and shutter and projection means (eg lens) positioned such that when said film cartridge is engaged with said control unit, film is presented for exposure by light selectively admitted through said aperture.

In a further aspect the present invention broadly consists in an film cartridge containing a film of an elongate kind having a first distal end and a second distal end engaged to a spooling spindle within a film canister, said cartridge for engagement with a camera body to thereby in combination allow the capturing of images onto the film in reliance on appropriately provided and positioned light control and projection means of said camera body which selectively allow light to be projected onto a portion of the film in said cartridge, said film cartridge comprising:

an unexposed film spool region

a second spool region within which said film canister is retained

a bridging portion between said unexposed film spool region and said second spool region via which said film can be advanced to at least in part be moved from said unexposed film spool region to said second region

 said bridging region providing a dark room for said film extending between said unexposed film spool region and said second spool region when said film cartridge is engaged to said camera body

 said bridging region including an opening positioned such that when said film cartridge is engaged with said camera body, that portion of the film in said dark room is

presented for exposure by light admitted through said light control means of said camera body and said opening of said film cartridge, and

wherein said film cartridge prevents light from entering said unexposed spool.

Preferably film cartridge is a housing within which said film is located and sealed from exposure to light save for that portion of the film in said dark room.

Preferably said bridging region is an enclosure which includes said opening.

Preferably said enclosure is also open to said second spool region.

Preferably said unexposed spool region is enclosed save for a narrow slot through which said film can pass, such that said film is said unexposed film spool region is substantially sealed to light.

Preferably said second spool region includes a drive means for driving said spooling spindle form external of said film cartridge.

Preferably said housing is a two part housing having a front and rear part separably engaged to each other.

Preferably said rear part is a lid separably engaged to the front part.

This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a camera body and cartridge film prior to it being engaged with the body.

Figure 2 is a perspective view of the film cartridge inserted in the camera body.

Figure 3 is the film cartridge with the backing plate of the cartridge and the film removed.

Figure 4 is the same diagram as Figure 3 but with film added.

Figure 5 is a perspective view of the front of the film cartridge showing the window and various operating features.

Figure 6 shows the fully assembled film cartridge.

Figure 7 shows the partial insertion of the film cartridge into the camera body and shows the operation of the film cartridge door.

Figure 8 shows the camera body from underneath showing the features that operate the film cartridge door.

Figure 9(a) and 9(b) show the bottom and top of the camera and film cartridge respectively and illustrate some of the film advancement and control features.

Figure 10 is a camera body and film cartridge assembled together viewed from the bottom showing the means with which the photographs remaining on the film are counted.

Figure 11(a) to 11(c) show the insertion of the film cartridge into the camera and in doing so the opening of the film cartridge shutter.

Figure 12(a) and Figure 12(b) show an alternative embodiment for the opening of the film cartridge door as the film cartridge is inserted into the camera body.

Figure 13(a) and Figure 13(b) illustrate a method where the camera shutter is actuated to thus exposing the film.

Figure 14(a) and Figure 14(b) show an embodiment where the door for opening the dark room is part of the film cartridge but actuated by an actuator means of the camera body.

Figure 15 shows an embodiment where the film cartridge is slid up and into the camera body.

Figure 16 shows an alternative film cartridge insertion embodiment whereby the film is inserted from the back of the camera body.

Figure 17 shows a further alternative embodiment of the invention whereby the film cartridge comprises body of the camera including the camera shutter mechanism and a top section which comprises the control means and also the viewing and flash means.

Figure 18 shows a different embodiment of the film cartridge of the present invention where no door is provided to light seal the dark room of the bridging portion.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Illustrated in Figure 1 is the camera body 1 and a film cartridge 2, which in this view is inserted into the camera body from below. On the front of the camera body there

is provided the view finder 4, the camera flash 3 and the camera lens 5. Spring loaded arms 32 bear against the back of the film cartridge to locate the cartridge in position. A camera with flash function and auto winding function will also include electric circuits for the flash light and the motor, a battery slot and a gear system.

Depicted in Figure 2 is the fully assembled camera comprising the camera body 1 and the film cartridge 2 which has been inserted from below and locked into position. Clearly shown in Figure 3 is the disassembled film cartridge 2 with the back plate removed and the film removed. The film cartridge internals consist of a region 7 for exposed film and advancing sprockets 8 and 9 at the top and bottom respectively of the film cartridge to positively engage the film and its periphery. A film supporting structure 11 runs around the periphery of the dark room 10, which together with the back plate and a film cartridge door provides a light proof chamber for the film inside the cartridge. A spool 12 contained within the body of the film cartridge 2 allows the winding on of a section of film into the dark room and subsequent exposure for an image to be captured.

In Figure 4 there is shown the film 29 that has been loaded into the film cartridge 2. The film, from the unexposed film spooling region 12, is passed through the dark room and engaged with the advance sprockets 8 and 9 and collected by the film collection spool 6. The film in the film cartridge is for example a standard 35 mm film scroll attached to a film canister that is loaded in to the film cartridge by the factory. In this way the user does not have to consider handling, exposure and contamination issues of the film. The rolling structure of the camera body is attached to the sprockets 8 and 9 of the film cartridge and it rolls the film back to the used film spool region which for example includes the film canister. The canister is for example a standard container for 35 mm films and therefore allows the film to be processed normally by any camera shop after the film is removed from the film cartridge. The advancement of the film may however be the other way around where it is dispensed from the canister as opposed to collected therein.

The region of the cartridge where the film extends across the dark room requires a control of light to be provided such that when the cartridge is not engaged with the camera body, any film extending across the dark room is not undesirably exposed. However at the same time the dark room does require light to be accessible into the dark room when the cartridge is engaged with the camera body for the taking of a photograph.

The dark room has a light opening 22 which allows for such light as controlled by the shutter of the camera body, to expose that portion of the film in the dark room. The light opening however is preferably closed when the cartridge is not engaged with the camera body. This closure is preferably achieved by a door 13. The door 13 is in a condition to prevent light from entering the dark room through the light opening 22 at least during times when the cartridge is not fully engaged with the camera body.

In figure 5 there is shown one embodiment of the film cartridge whereby safety releases 33 prevent the movement of the film cartridge shutter 13 unless correctly engaged with the camera body. In this particular embodiment the insertion of the film cartridge 2 into the film body 1 activates the safety releases to allow the film cartridge door to be opened. The location of the film cartridge by insertion also then opens the film cartridge door, thereby placing the film cartridge in a state ready for exposure by the camera body shutter mechanism to expose on demand by the user the film and thus create an exposure on the film of the image captured.

Figure 6 shows the fully assembled film cartridge 2 with the backing plate 15 attached. With the backing plate attached the film inside is safely guarded against any light penetrating and thus pre-exposing the film. The film cartridge is therefore ready for use by insertion into, or association with, the camera. In Figure 7 the safety releases 33 are activated when the film cartridge 2 is inserted into the camera casing 1 by the front inside panel of the camera casing. Once these safety releases have been activated the film cartridge door 13 is then free to slide out of the way when in the safety within the camera body by door moving means 16 shown in figure 8. In this way the film cartridge (and thus the film) can safely be removed and inserted at will by the user with there being no risk of undesired exposure of the film.

Figure 9 shows the association of the controls within the camera casing 1 in figure 9(b) to those mounted on top of the film cartridge 2. The film wind on control 17 of the camera body engages to a receiving means 18 on the film cartridge. In this way, wind on of the film effected by the user on the camera body will be transmitted to the actual film in the film cartridge. The top film advance sprocket has receiving means 19 associated with it to engage with an interlock control 20 in the camera body. The interlock control prevents the double exposure of the film. The arrangement may work whereby the means

to activate the camera shutter mechanism and thus take a photograph is only enabled when the film has been wound on. In a situation where the film has not been wound on from a previous photograph having been taken then the camera shutter mechanism activation means will not be enabled. The film counter 14 can be seen in figure 5, which records the number of photographs either taken or remaining on the roll of film. The film counter 14 as shown in Figure 10 is visible through an aperture 21 in the base of the film cartridge 2, and is shown in Figure 10. By direct association with the bottom winding sprocket 8 the number of exposures taken, and or remaining on the film roll can be known.

Figure 11 (a) (b) and (c) show a series of movements of the film cartridge door 13 by translation to progressively open the film cartridge aperture 22. The film cartridge 2 is shown in figure 11 (a) partially inserted into the camera body 1. Figure 11 (b) shows the film cartridge 2 inserted into the camera body 1 just prior to engagement of the film cartridge shutter 13 with means (not shown) to open the film cartridge aperture 22. Final insertion of the film cartridge 2 into the camera body 1 moves the film cartridge door 13 completely and opens the film cartridge aperture 22 thus allowing a photograph to be taken upon pressing of the shutter activation button 23. The film cartridge door is normally held closed when the film cartridge is out of the camera cartridge by springs 24 (a) and (b) which attach to the film cartridge at their upper point and to the film cartridge door at their lower point.

Figures 12(a) and (b) show an alternative means to that of Figure 11 for opening the film cartridge door upon insertion of the film cartridge 2 into the camera body 1. Figure 12(a) shows the film cartridge 2 partially inserted into the camera body 1. The film cartridge door 13 is rotatably located by a pivot 25 and held in place by a spring means 26. A film cartridge door opening means 27 is located within the camera body. Upon final insertion of the film cartridge 2 into the body of the camera 1 as depicted in figure 12(b) the opening means 27 bears upon the film cartridge shutter 13 and rotates it, in this case, by for example 90 degrees to open the film cartridge aperture 22. In this way correct operation of the camera shutter by the shutter activation button 23 will take a photograph of the viewed image.

Figure 13(a) shows a film cartridge 2 fully inserted into the camera 1 and a film cartridge shutter 13 covering the film cartridge aperture 22. Figure 13(b) shows the

aperture 22 uncovered by rotation of the film cartridge door 13 to the left. Here the film cartridge door doubles as the camera shutter mechanism and also as the film cartridge door. The taking of a photograph by activation of the shutter button 23 activates the film cartridge door to rotate to one side and thus expose the film (which is also the camera shutter) to the image.

Figures 14(a) and (b) show an alternative means for film exposure. A cartridge door mechanism 30 in figure 14(a) is closed. Activation of the door is achieved by a button accessible from the exterior of the camera and the door folds into the dark room 10. Once the door is open the camera can be used at will to take photographs by the provision of the aperture, lens and shutter of the camera body.

One embodiment of the camera 1 and the film cartridge 2 is shown in Figure 15, whereby the film cartridge 2 is brought into the camera from beneath and locked into position. Figure 16 shows an alternative embodiment whereby the film cartridge 2 is inserted into the camera 1 from the rear face of the camera 1 and locked into position. Figure 17 shows a further alternative embodiment whereby the film cartridge 2 contains not only the film and the exposure means but also the lens and is itself a component of the camera which the user will hold onto. This combination film-cartridge-camera body is then attached to control body 31 which includes the shutter activation button 23, the viewing means 4, and the flashlight means 3. In this way the camera body is reduced to the bare minimum needed to activate, control and aim the camera and the film cartridge attaches to it and is the disposable or reattachable component. It is also envisaged that the cartridge of the present invention as for example shown in Figures 3-6 may come in a form where there is no door provided and where the aperture 22 for the dark room 10 is not light sealable independent from being engaged with the camera body. This embodiment is for example shown in figure 18. The cartridge in this form may for example be substantially provided as shown in Figures 3-6 save for the provision of the door 13. The cartridge in a pre-used condition for example provides the film in a preloaded condition where a canister 6 is provided at the second spool region and where the film extends therefrom to provide the substantial portion of the film spooled in the unexposed film spooling region 12. That portion of the film extending between the two spooling regions and through the dark room will in such situations be exposed to light

entering through the aperture 22. In such a pre-used condition the first frame of the film will be exposed however once the cartridge is inserted into the camera body the subsequent winding on of the film onto the canister 6 will present the subsequent frames for appropriate exposure in capturing the image projected through the lens aperture and shutter of the camera body. The images that are then captured and wound onto the canister will then be retained in the canister in a light sealed environment. In order to ensure that the unexposed film in the unexposed film spooling region also remains unexposed at times where the cartridge is external of the camera body, this unexposed film spooling region is also light sealed. Such light sealing is preferably achieved by ensuring that the film extending from the unexposed film spooling region extends through a very narrow slot (as for example similar to the slot provided in the film canister) thereby preventing light from entering into the unexposed film spooling region. Such configuration is desirable whether or not the cartridge is provided with or without the door. Should the cartridge be removed from the camera midway during use, that frame presented in the dark room will become exposed to light however upon reinsertion of the cartridge into the or another camera body, will then merely require the winding on of the film to advance the film to present an unexposed frame in the dark room for the subsequent exposure for capturing the next image. At the end of the use of the cartridge the film will have been wound on fully into the canister which can then be removed from the casing of the cartridge for processing by standard processing equipment.

The film cartridge can easily be ejected from the camera body when a switch is pushed releasing the film cartridge from the camera body. The camera body can in this way be used many times, and the film cartridge may also be recycled with new film loaded into it. Further, the removable/replaceable feature as indicated above enables the change of different types of film to suit different uses (eg. different ASA) or the grouping of photos of a particular nature in a particular roll of film/film set (eg. different occasions, different groups of people, different subject matters etc). Interchangeability of camera bodies for one film cartridge can also be achieved with the present invention. A camera body which provides particular features such as a wide angled lens, a coloured lens or other effect type lens may be provided where the film cartridge of the present invention is interchangeable between such bodies.

DATED THIS 21st DAY OF November 2001
AJ PARK
PER *Slightingale*
AGENTS FOR THE APPLICANT

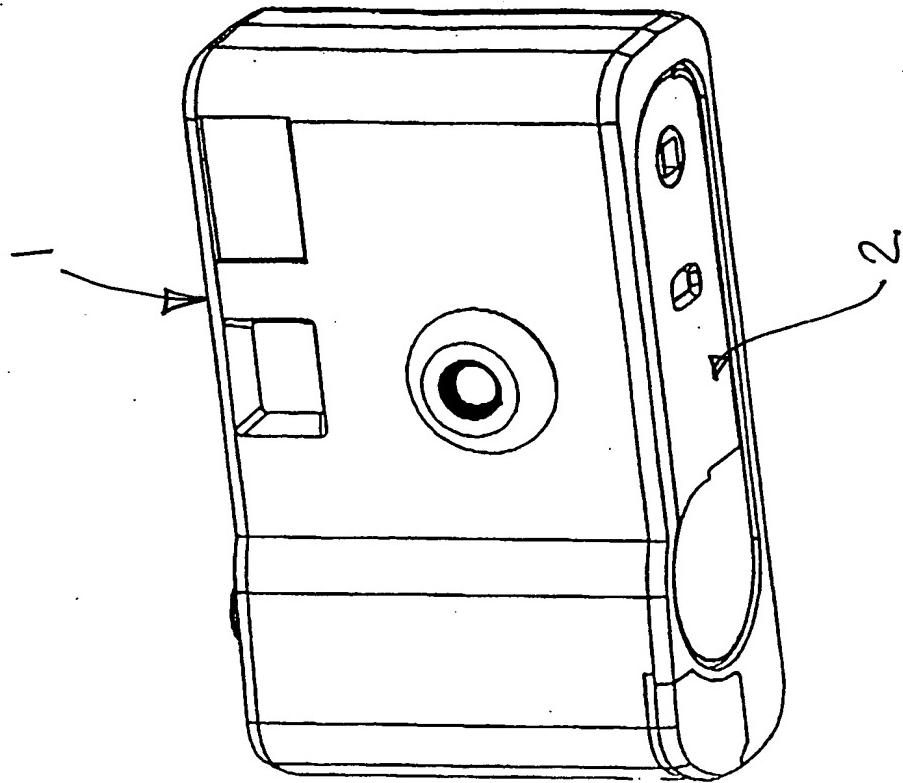


FIGURE 2

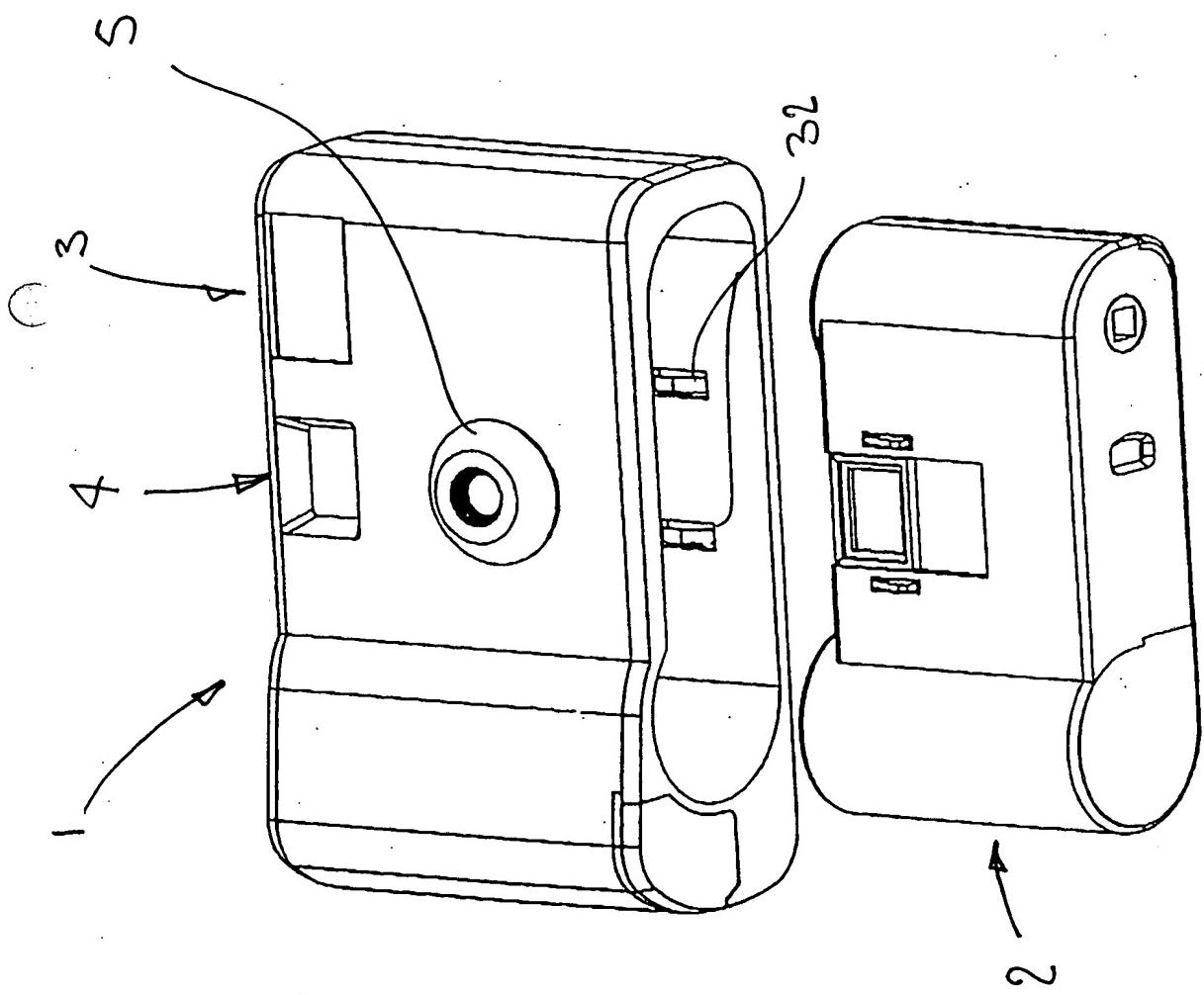


FIGURE 1

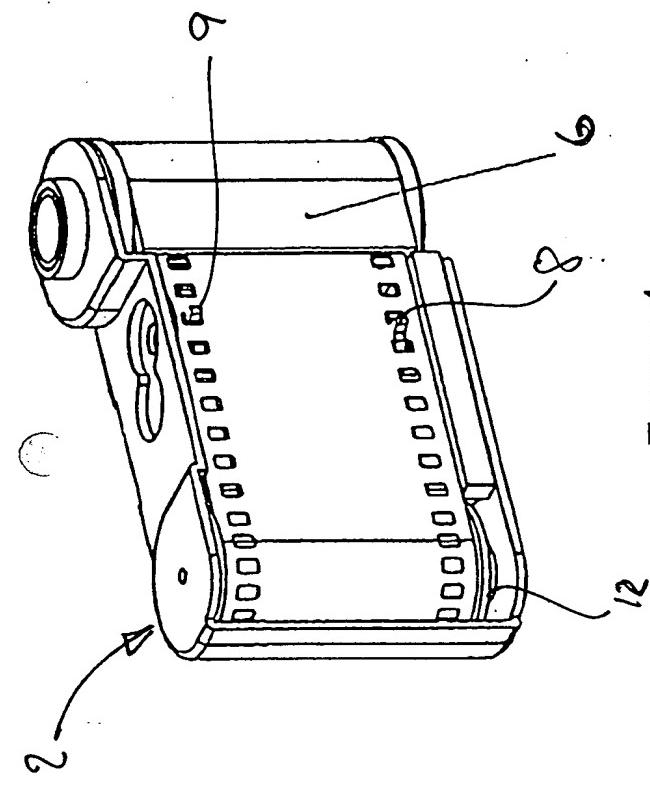


FIGURE 4

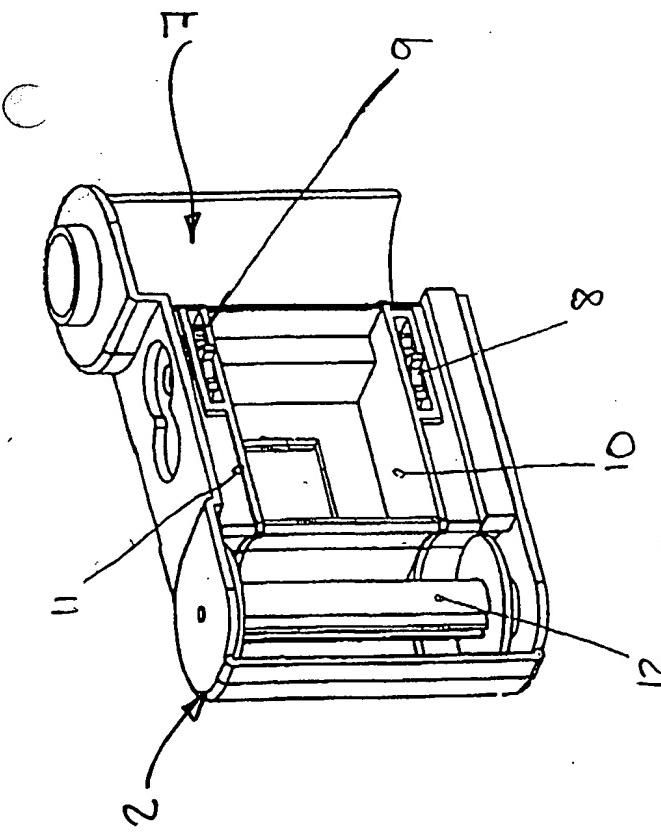


FIGURE 3

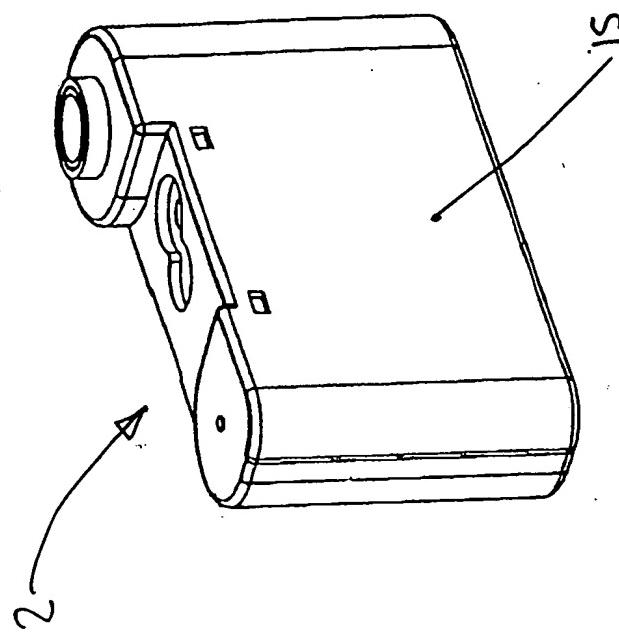


FIGURE 5

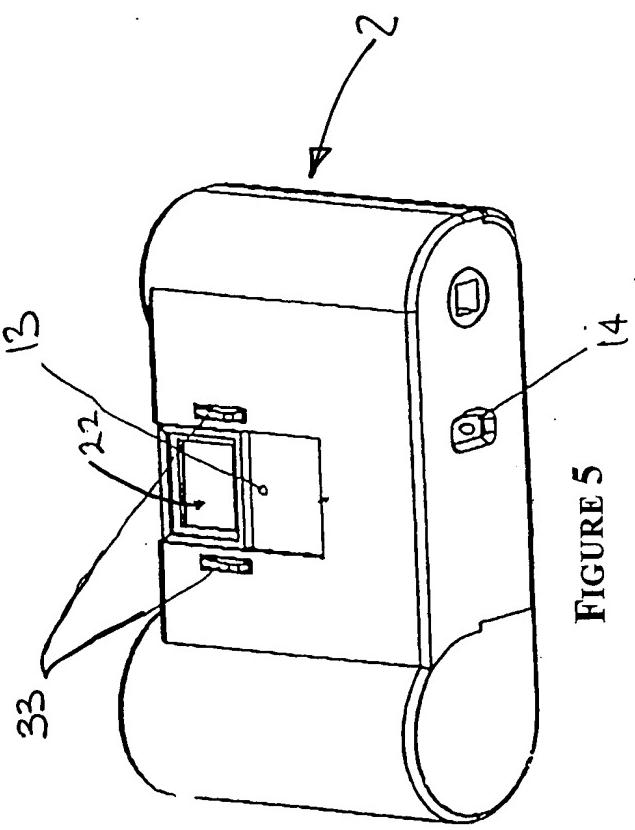


FIGURE 6

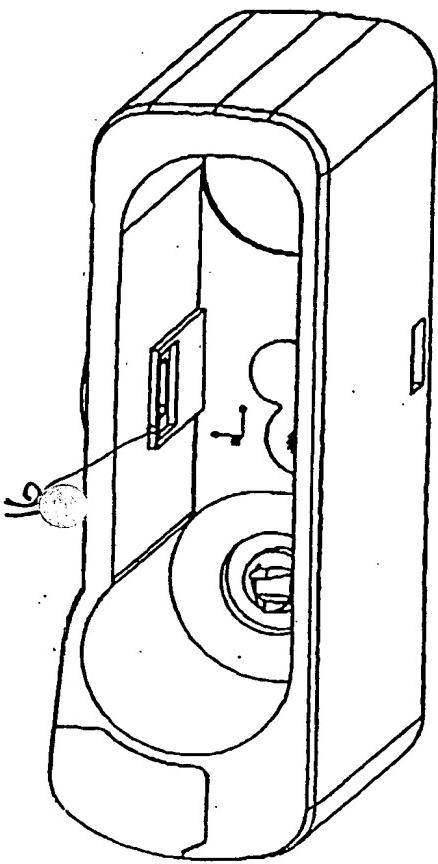


FIGURE 8

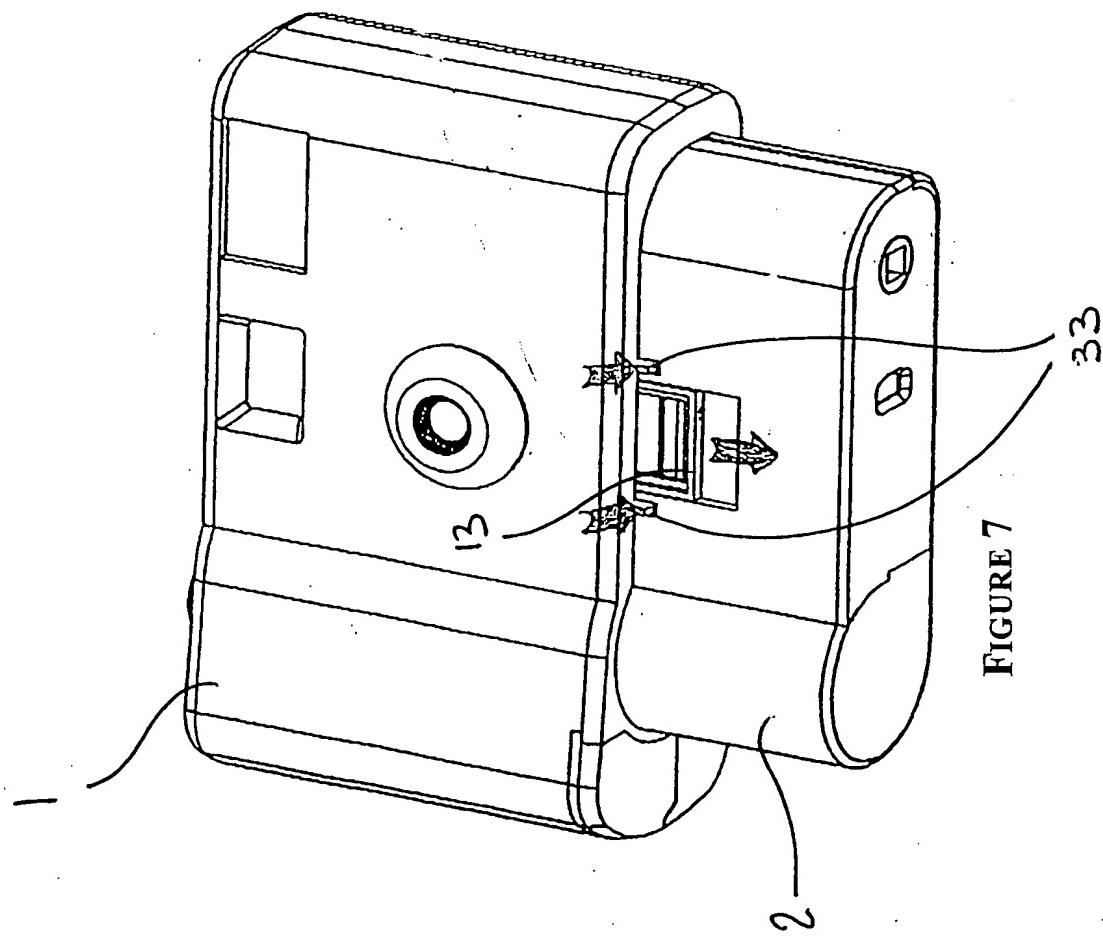


FIGURE 7

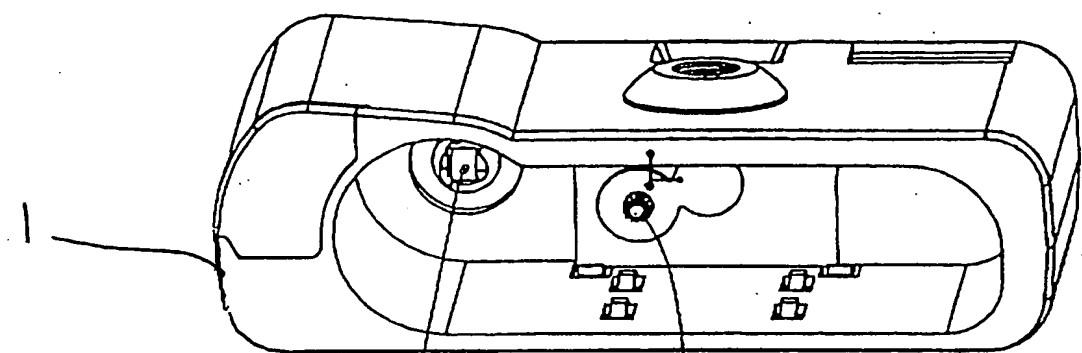


FIGURE 9(b)

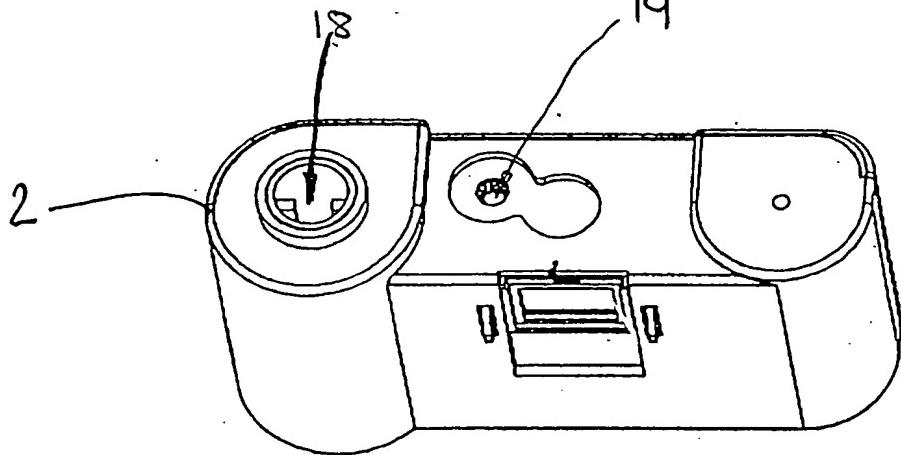


FIGURE 9(a)

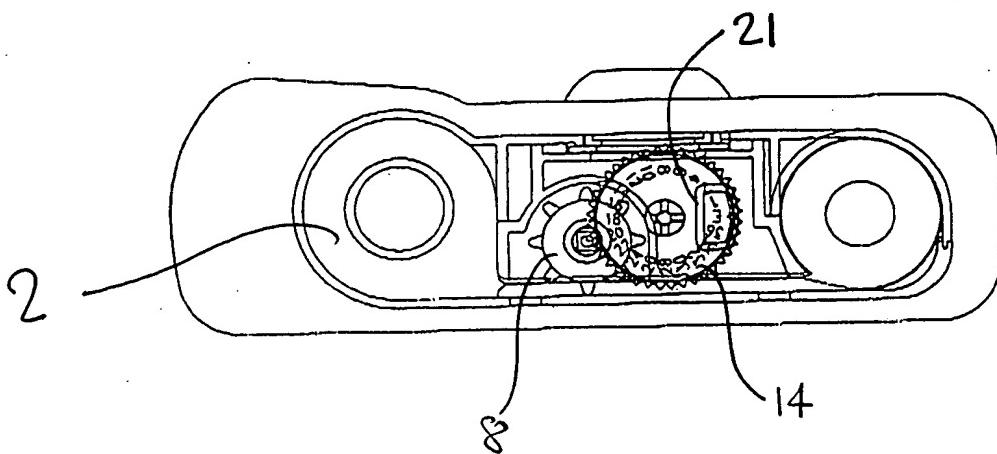


FIGURE 10

FIGURE 11(a)

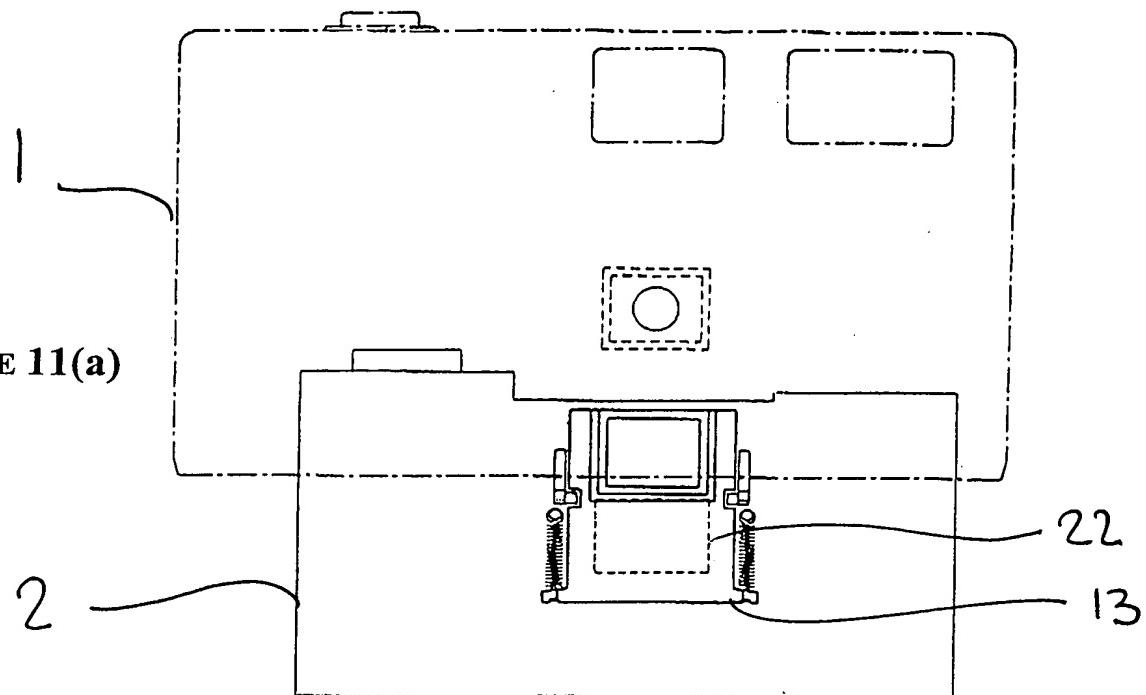


FIGURE 11(b)

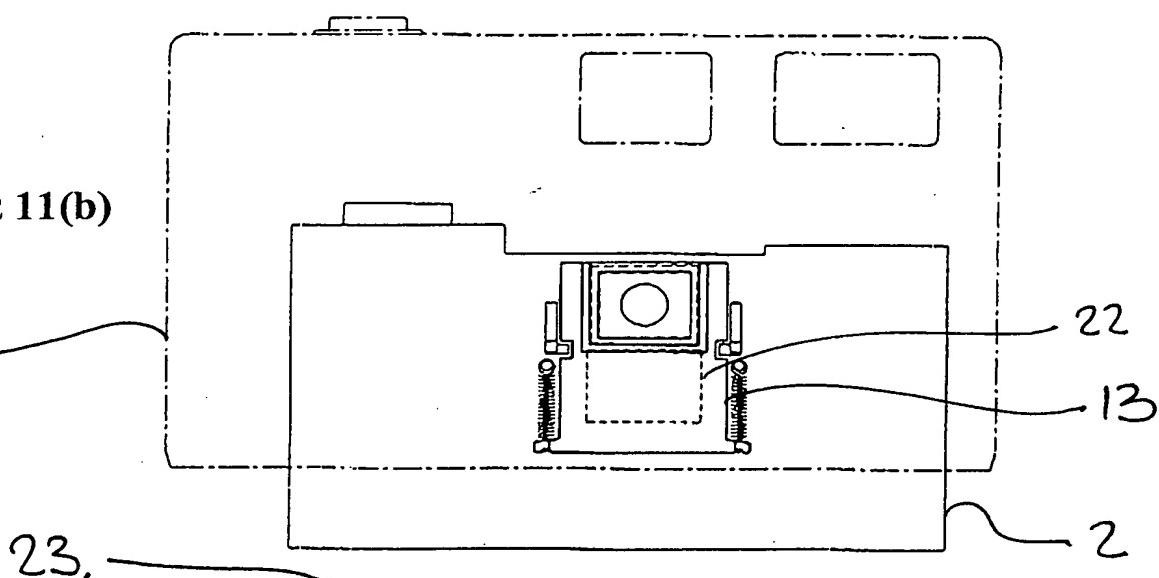
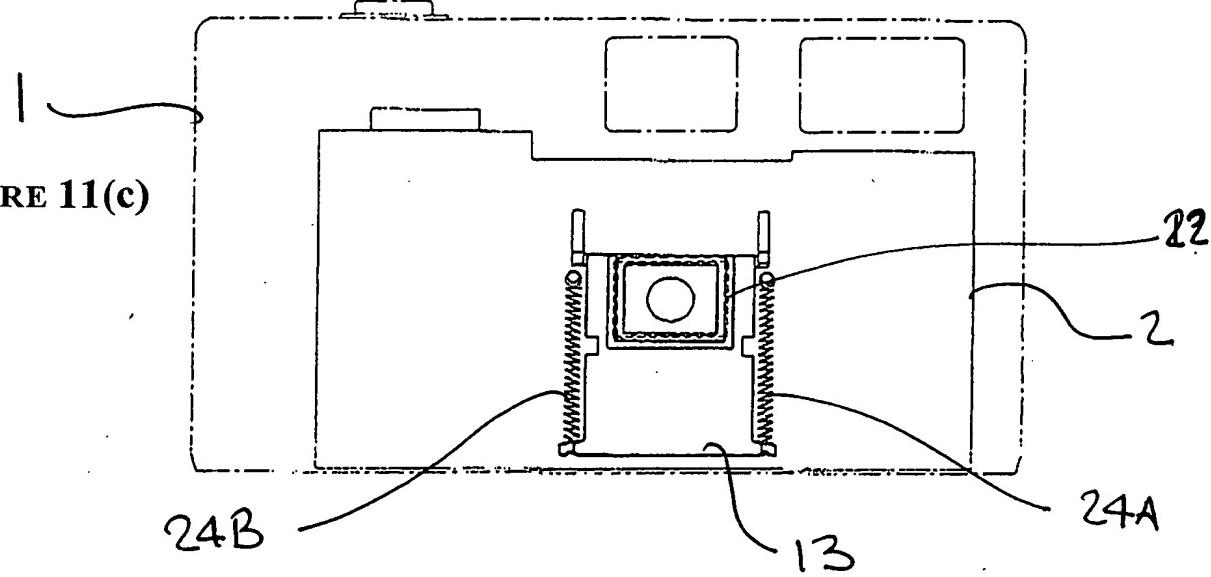


FIGURE 11(c)



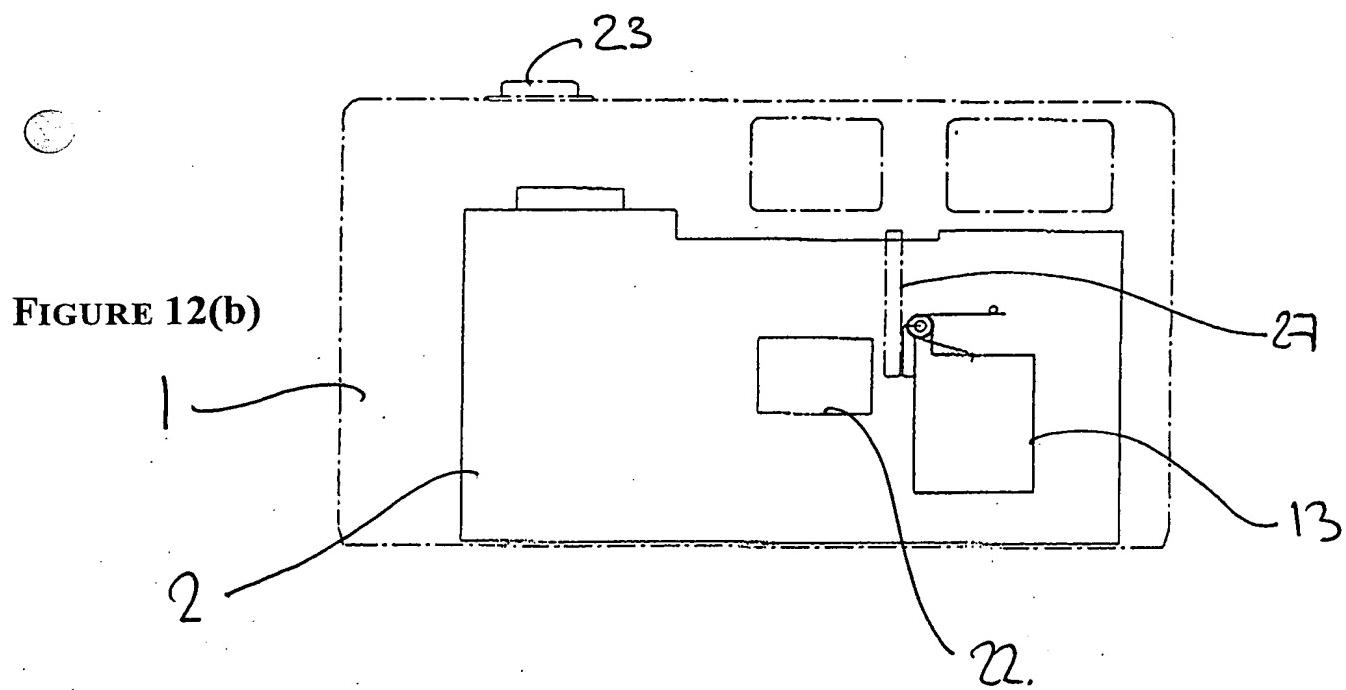
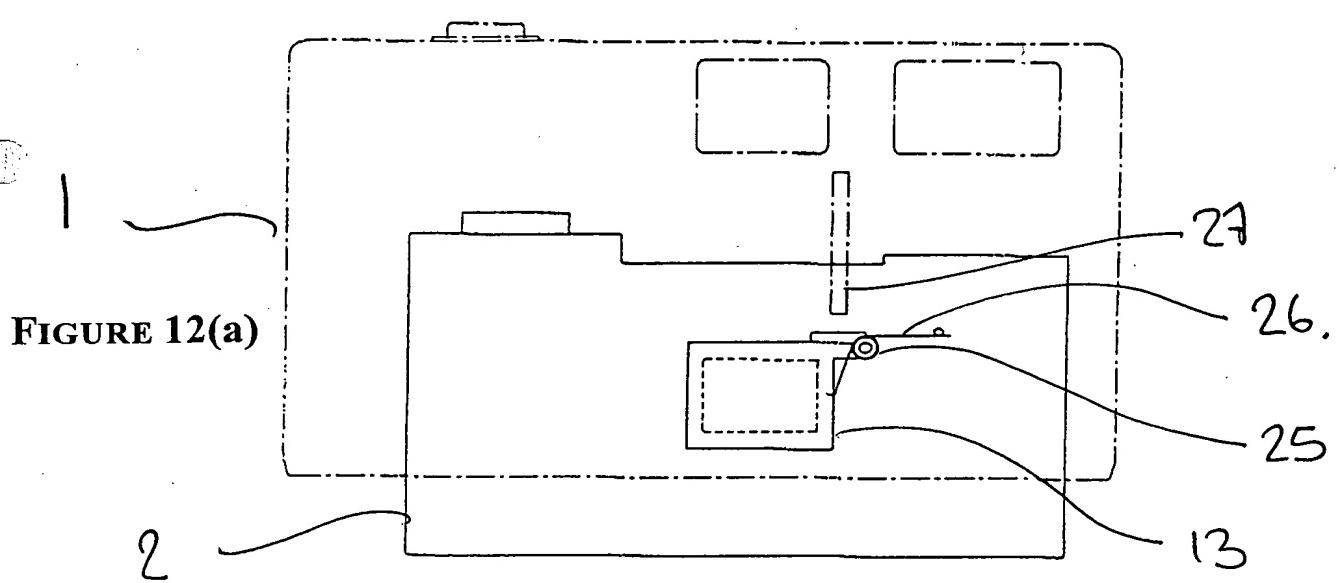


FIGURE 13(a)

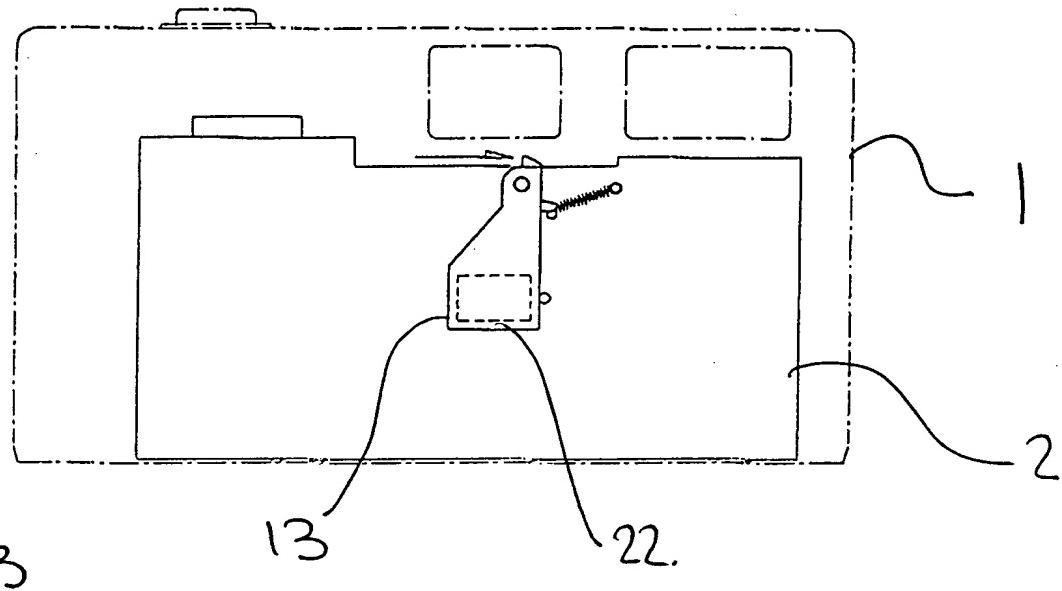
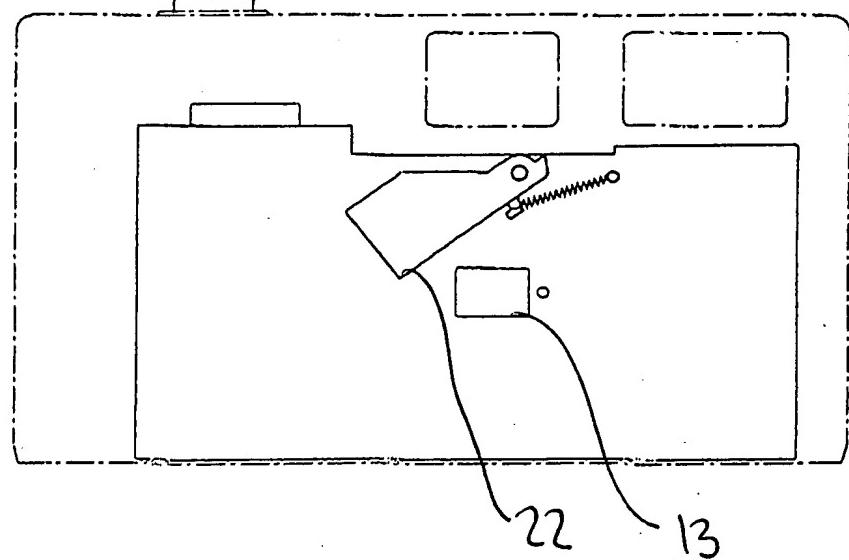


FIGURE 13(b)



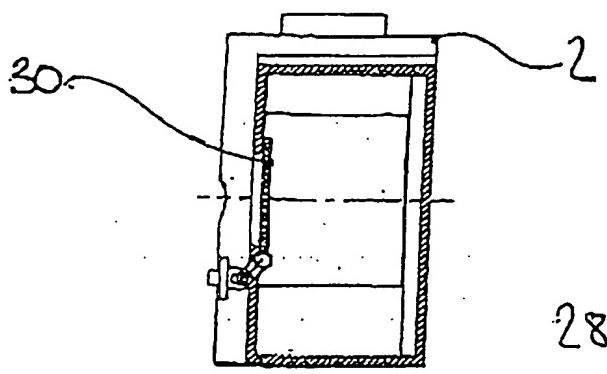


FIGURE 14(a)

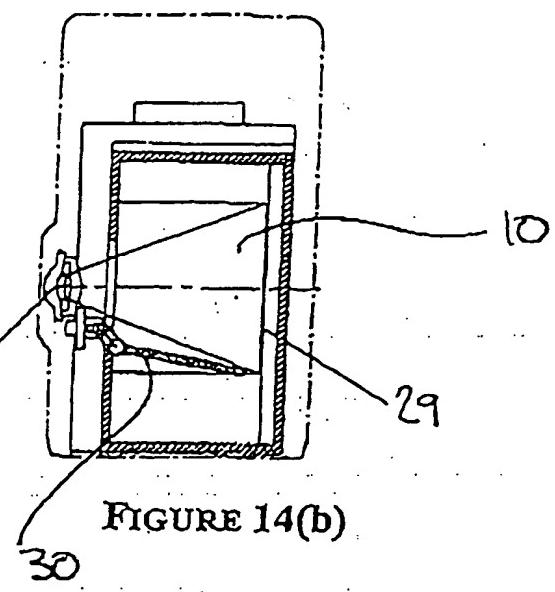


FIGURE 14(b)

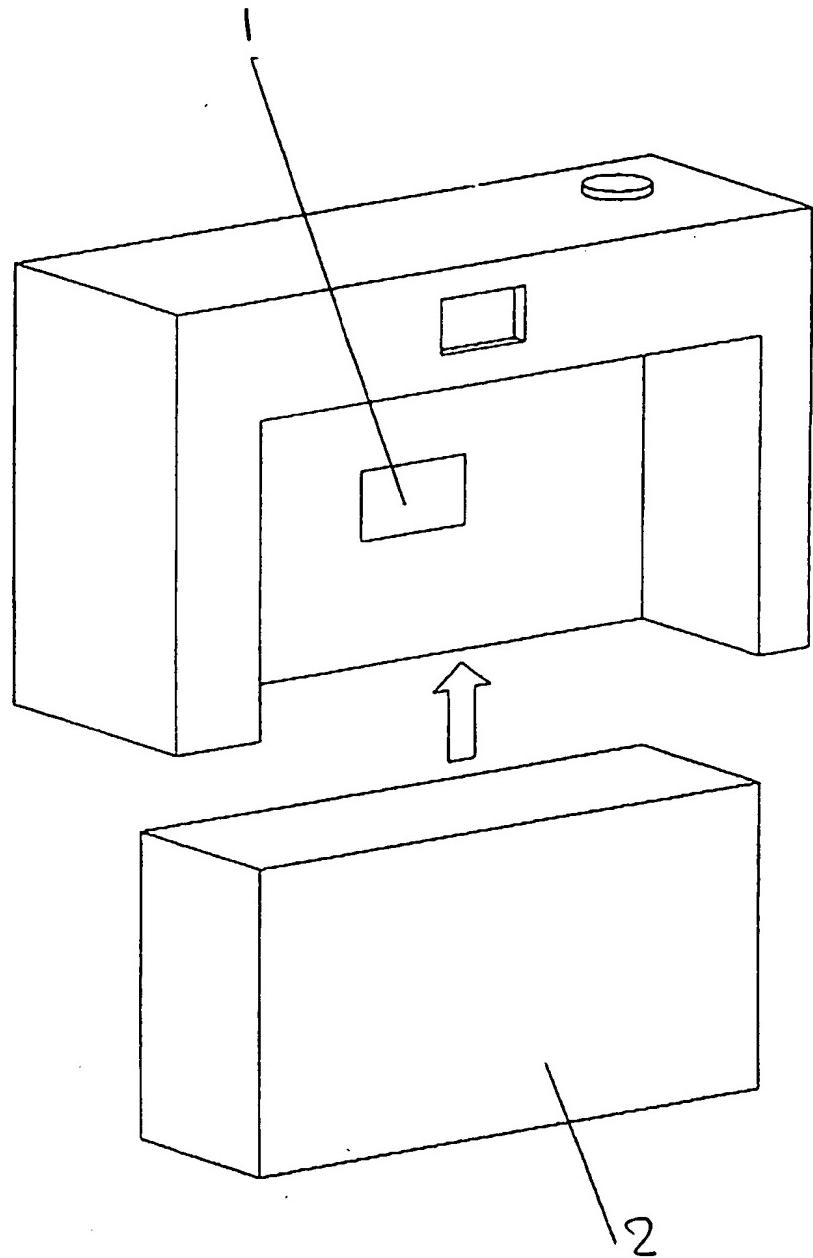


FIGURE 15

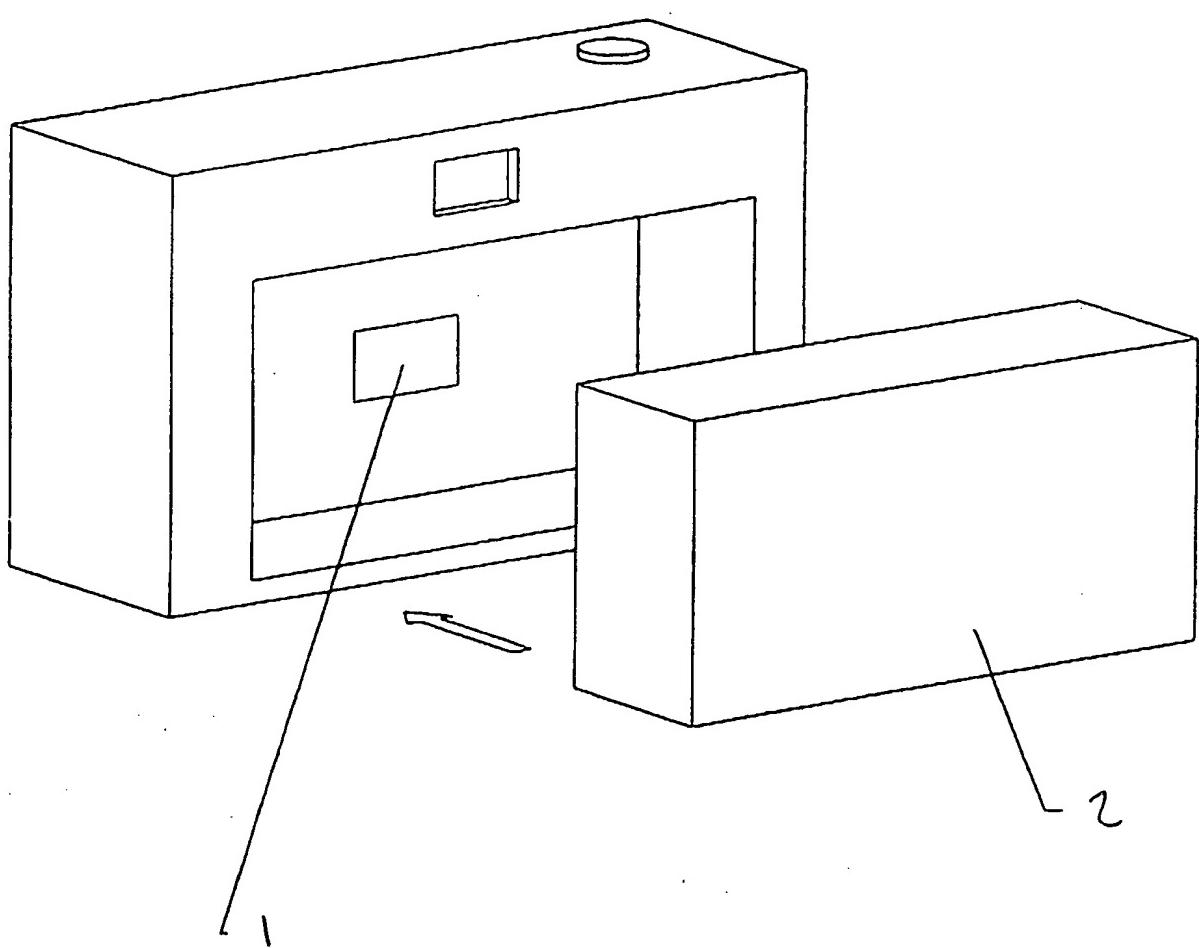


FIGURE 16

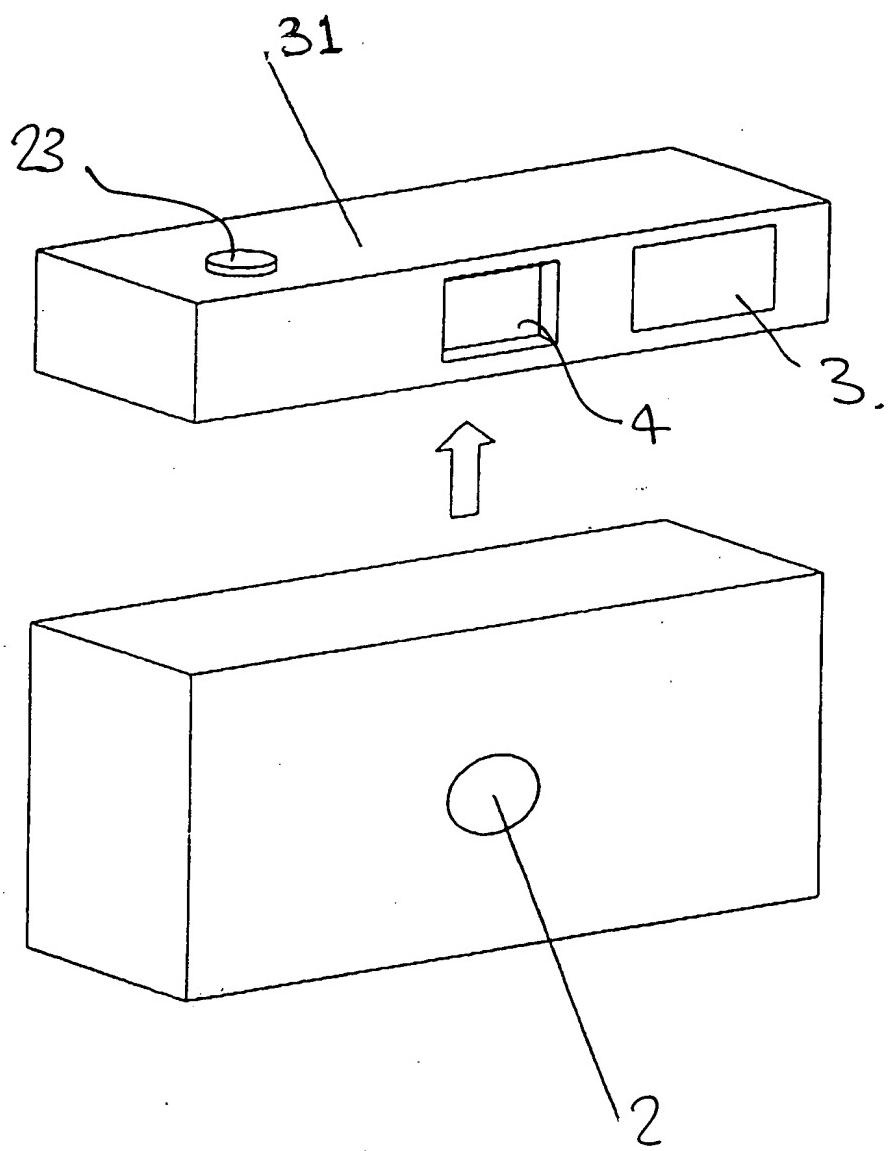


FIGURE 17

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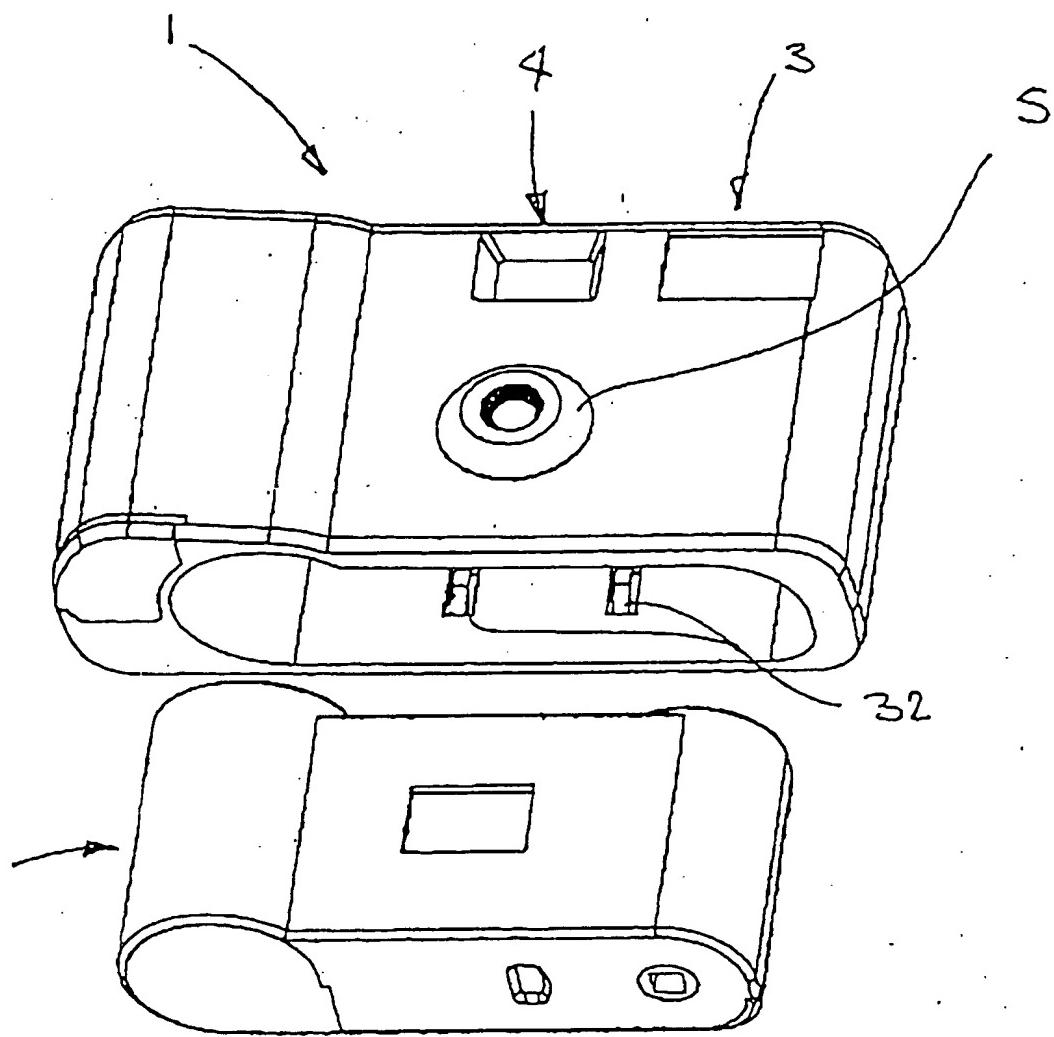


FIGURE 18